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Asotin Creek ISCO Water Sample Data Summary

Water Year 2002

Annual Report 2001 - 2002 August 2003 DOE/BP-00005130-1

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Bonneville Power Administration
P.O. Box 3621
Portland, OR 97208

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Asotin Creek
ISCO Water Sample Data Summary

Water Year 2002

Prepared by

Stacia Peterson
Umatilla National Forest
North Zone Hydrologist

Prepared for

U.S. Department of Energy
Bonneville Power Administration
Division of Fish and Wildlife
P.O. Box 3621
Portland, OR 97208-3621

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United States Department of Agriculture | **Forest Service** | **Pomeroy Ranger District** | **71 W. Main St. Pomeroy, WA 99347**

File Code: 2500 Watershed **Date:** July 21, 2003
Subject: Asotin Creek ISCO Water Sample Data Summary Water Year 2002
By: Stacia Peterson, Umatilla National Forest, North Zone Hydrologist
To: Brad Johnson, Asotin Model Watershed

The Pomeroy Ranger District operates 3 automated water samplers (ISCOs) in the Asotin Creek drainage in cooperation with the Asotin Model Watershed. The samplers are located on Asotin Creek: Asotin Creek at the mouth, Asotin Creek at Koch site, and South Fork Asotin Creek above the forks. At the end of Water Year (WY) 2001 we decided to sample from Oct. 1 through June 30 of each water year. This decision was based on the difficulty of obtaining good low flow samples, since the shallow depth of water often meant that instrument intakes were on the bed of the river and samples were contaminated with bed sediments. The greatest portion of suspended sediment is transported during the higher flows of fall and especially during the spring snow runoff period, and sampling the shorter season should allow characterization of the sediment load of the river.

The ISCO water samplers collected a daily composite sample of 4 samples per day into one bottle at 6-hour intervals until late March when they were reprogrammed to collect 3 samples per day at 8-hour intervals. This was done to reduce battery use since battery failure had become an ongoing problem. The water is picked up on 24-day cycles and brought to the Forest Service Water Lab in Pendleton, OR. The samples are analyzed for total suspended solids (TSS), conductivity, and turbidity. A total dissolved solids value is estimated based on conductivity. The USGS gage, Asotin Creek at the mouth, # 13335050 has been discontinued and there are no discharge records available for this period.

Asotin Creek at the Mouth

The Asotin Creek at the mouth ISCO sampler collected samples from October 15, 2001 through June 14, 2002. A few gaps in the record occurred when the sampler malfunctioned, the battery failed, or the intake lines froze. As noted above, the number of samples collected each day was reduced in late March in an effort to improve battery performance.

Table 1 shows the maximum, minimum and mean values for the sampled parameters. The maximum values occurred on April 15, 2002.

Table 1. Asotin Cr. At the Mouth: Maximum, Minimum, and Average Values WY 2002.

	TSS (mg/L)	CND (uS/cm)	TDS (mg/L)	Turbidity (NTU)
Max	1189.1	139	66	230
Min	0.3	66	31	1.1
Mean	28.8	113.1	53.4	11.7

227 days sampled

Figure 1 shows the total suspended solids (TSS) and turbidity values for WY 2002. Turbidity and TSS track each other very closely. The TSS values are generally below 100 mg/L and the

turbidity values are generally below 50 NTUs. Spikes in November, April, and June are most likely due to storm and spring runoff events.

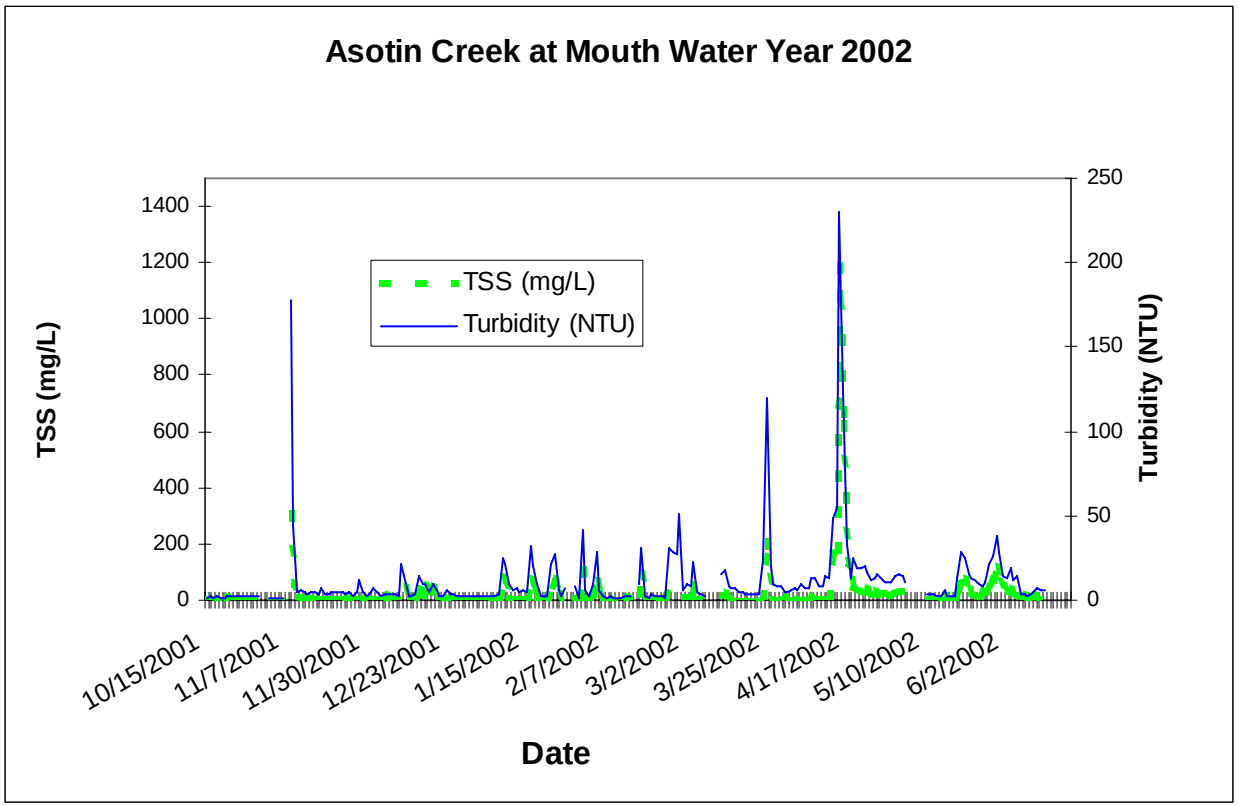


Figure 1. Asotin Cr. at the Mouth, Total Suspended Solids and Turbidity, WY 2002.

Asotin Creek At Koch's

The Koch site was operated from November 25, 2001 through June 14, 2002. It was started later than the other sites due to the shallow depth of water and the concern that bed sediments would be picked up in the samples. A few gaps in the record occurred when the sampler malfunctioned, the battery failed, or the intake lines froze. As noted above, the number of samples collected each day was reduced in late March in an effort to improve battery performance.

Table 2 shows the maximum, minimum and mean values for the sampled parameters. The maximum values occurred on April 14, 2002.

Table 2. Asotin Cr. at Koch: Maximum, Minimum, and Average Values WY 2002.

	TSS (mg/L)	CND (uS/cm)	TDS (mg/L)	Turbidity (NTU)
Max	649.4	114	54	170
Min	0.5	54	25	1
Mean	14.4	92.3	43.6	6.0

187 days sampled

Figure 2 shows the total suspended solids (TSS) and turbidity values for WY 2002. Turbidity and TSS track each other very closely. The TSS values are generally below 100 mg/L and the turbidity values are generally below 20 NTUs. Spikes in November, April, and June are most likely due to storm and spring runoff events.

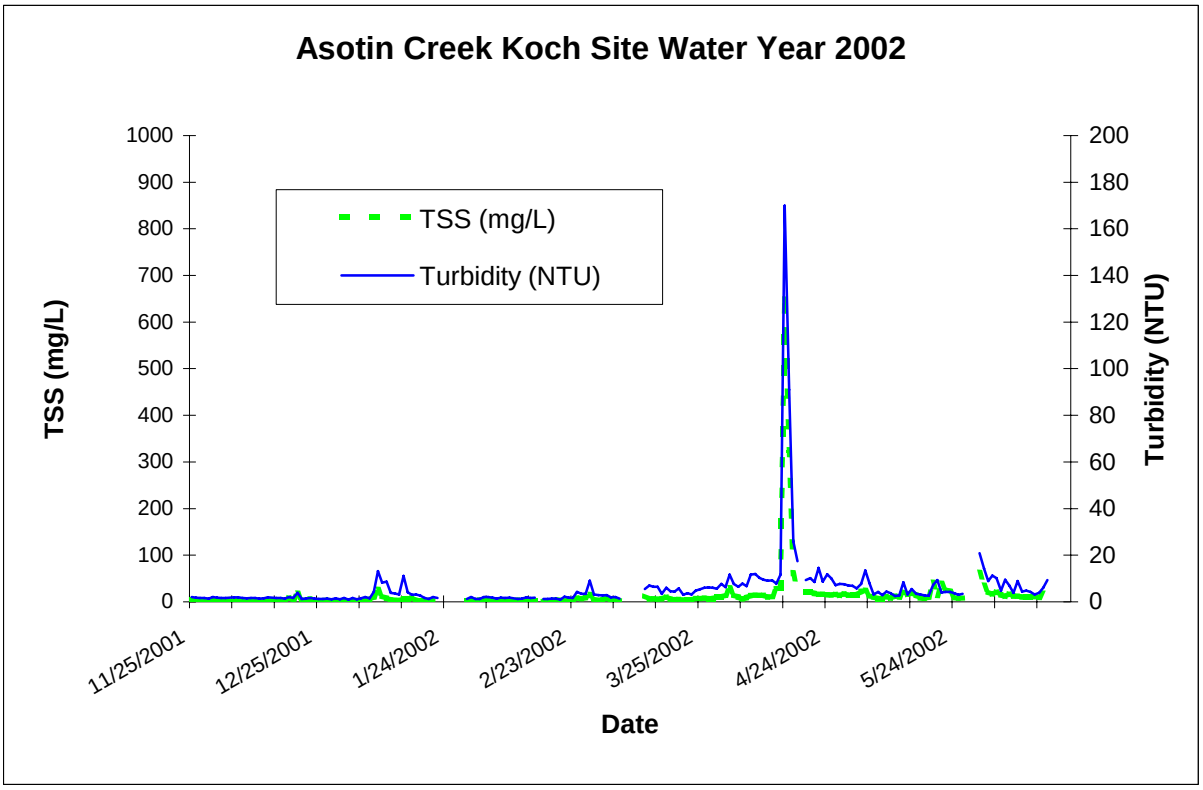


Figure 2. Asotin Cr. At Koch's, Total Suspended Solids and Turbidity, WY 2002.

South Fork Asotin Creek

The South Fork Asotin ISCO sampler collected samples from October 15, 2001 through June 20, 2002. A few gaps in the record occurred when the sampler malfunctioned, the battery failed, or the intake lines froze. As noted above, the number of samples collected each day was reduced in late March in an effort to improve battery performance.

Table 3 shows the maximum, minimum and mean values for the sampled parameters. The maximum values occurred on April 14, 2002.

Table 3. South Fork Asotin: Maximum, Minimum, and Average Values WY 2002.

	TSS (mg/L)	CND (uS/cm)	TDS (mg/L)	Turbidity (NTU)
Max	1148.5	101	48	304
Min	0.3	53	25	0.6
Mean	15.5	82.9	39.3	7.2

228 days sampled

Figure 3 shows the total suspended solids (TSS) and turbidity values for WY 2002. Turbidity and TSS track each other very closely. The TSS values are generally below 100 mg/L and the turbidity values are generally below 20 NTUs. Spikes in November, April, and June are most likely due to storm and spring runoff events.

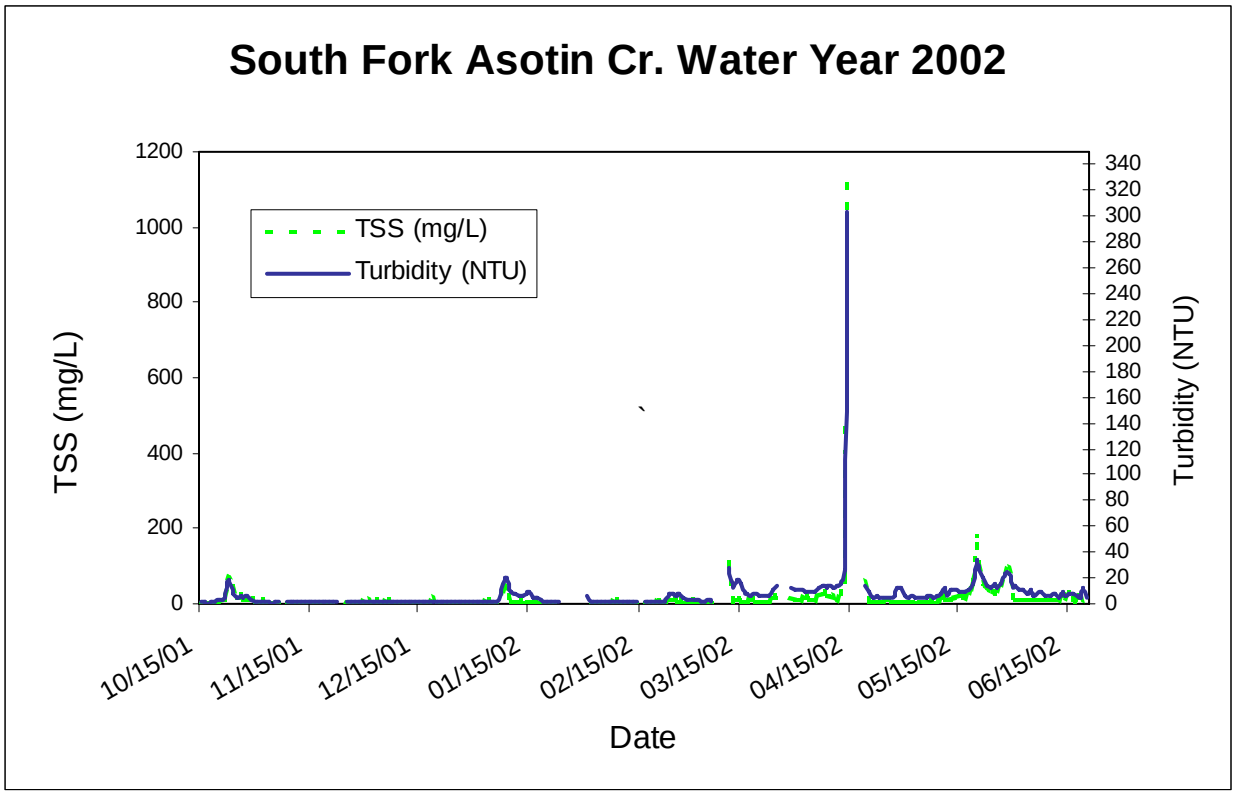
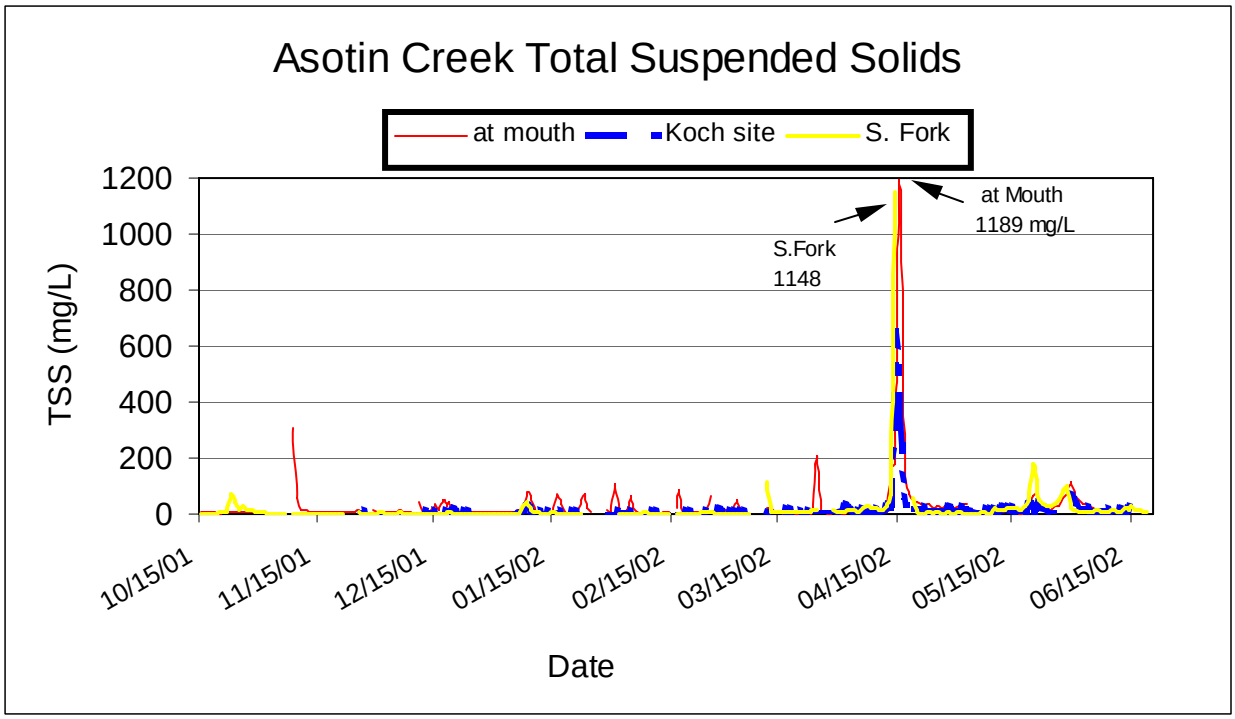


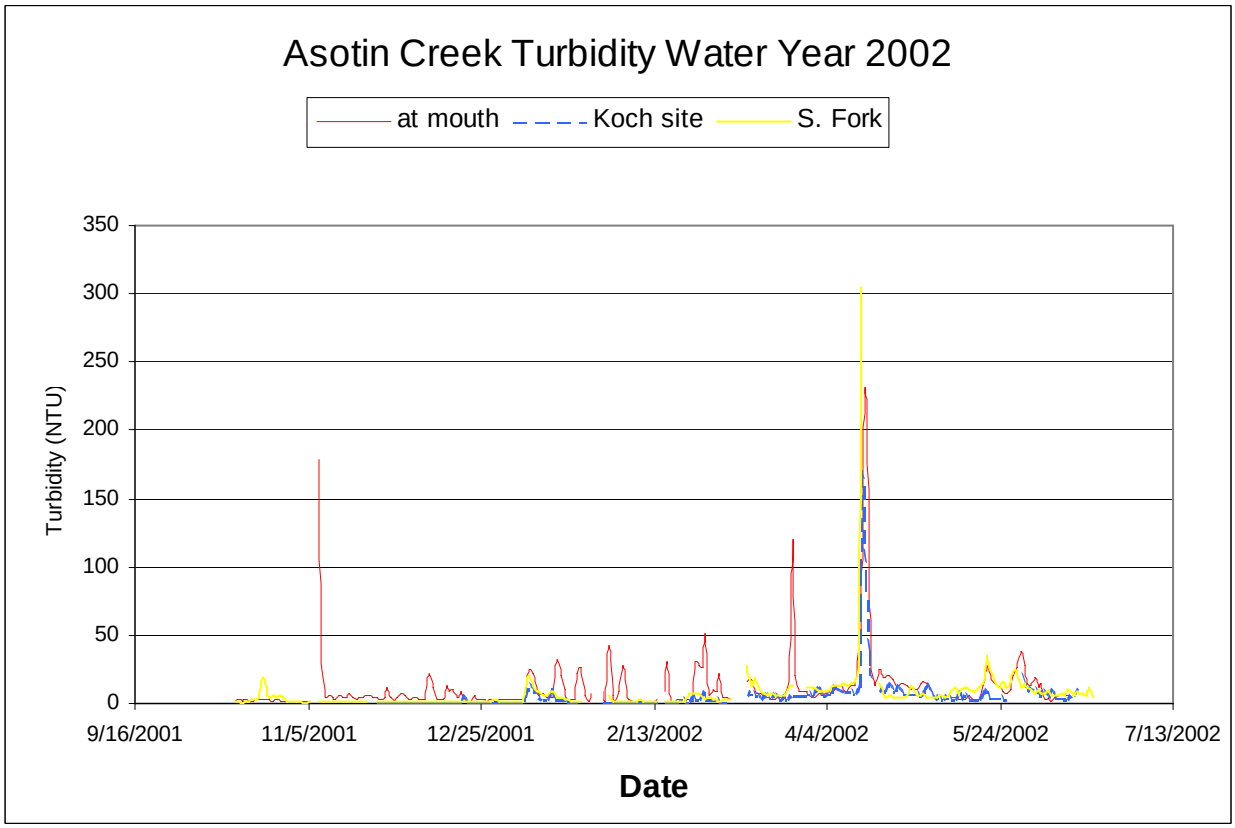
Figure 3. South Fork Asotin Cr., Total Suspended Solids and Turbidity, WY 2002.

Summary

The Asotin at Koch's site has about 50 days less data than the other sites, due largely to shallow water depths. Changing depositional patterns in the river led to the development of a large bar on the sampler side of the creek at this location. Concern over contamination of samples with bottom sediments led to relocation of the sample site about 1000 feet upstream for water year 2003. Continuing problems with battery failure were due to smaller battery size used with the streamlined ISCO machines being used at these sites. During water year 2003 fittings were developed to allow the use of larger batteries at these sites. Sample collection success has improved as will be reported in the next annual report.

The graphs on the following page compare TSS between the sites and turbidity between the sites. South Fork Asotin and the Koch site have a similar pattern of peaks and lows for both parameters suggesting similar influences. Asotin at the Mouth has generally higher values than either of the other sites and the pattern shows more peaks, suggesting different influences than are present at the upstream sites. The annual maximum TSS and turbidity measurements


Asotin Creek Total Suspended Solids
at mouth
Koch site
S. Fork
TSS (mg/L)
1200
1000
800
600
400
200
0
at Mouth
1189 mg/L
S.Fork
1148
10/15/01
11/15/01
12/15/01
01/15/02
02/15/02
03/15/02
04/15/02
05/15/02
06/15/02
Date


Asotin Creek Turbidity Water Year 2002
at mouth
Koch site
S. Fork
Turbidity (NTU)
350
300
250
200
150
100
50
0
9/16/2001
11/5/2001
12/25/2001
2/13/2002
4/4/2002
5/24/2002
7/13/2002
Date

occurred at all sites during the same event. NRCS Snow Survey data from the Spruce Springs Snotel site shows a warming trend from April 12 through April 14. Three inches of snow water equivalent was lost between April 10 and April 16, 1.3 inches of the reduction occurred on April 14 and 15. A half-inch of rain fell in the first 8 hours of April 14. On April 14 TSS and turbidity values a magnitude of order higher than any other records during this period were seen at the two upstream sites (South Fork Asotin and the Koch site). Highest TSS and turbidity at the mouth of the Asotin occurred on April 15.